

(15¢)

SCIENCE NEWS LETTER



DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE • AUGUST 12, 1944



Post-War Liner
See Page 106

A SCIENCE SERVICE PUBLICATION

KEEPING UP WITH
Electricity

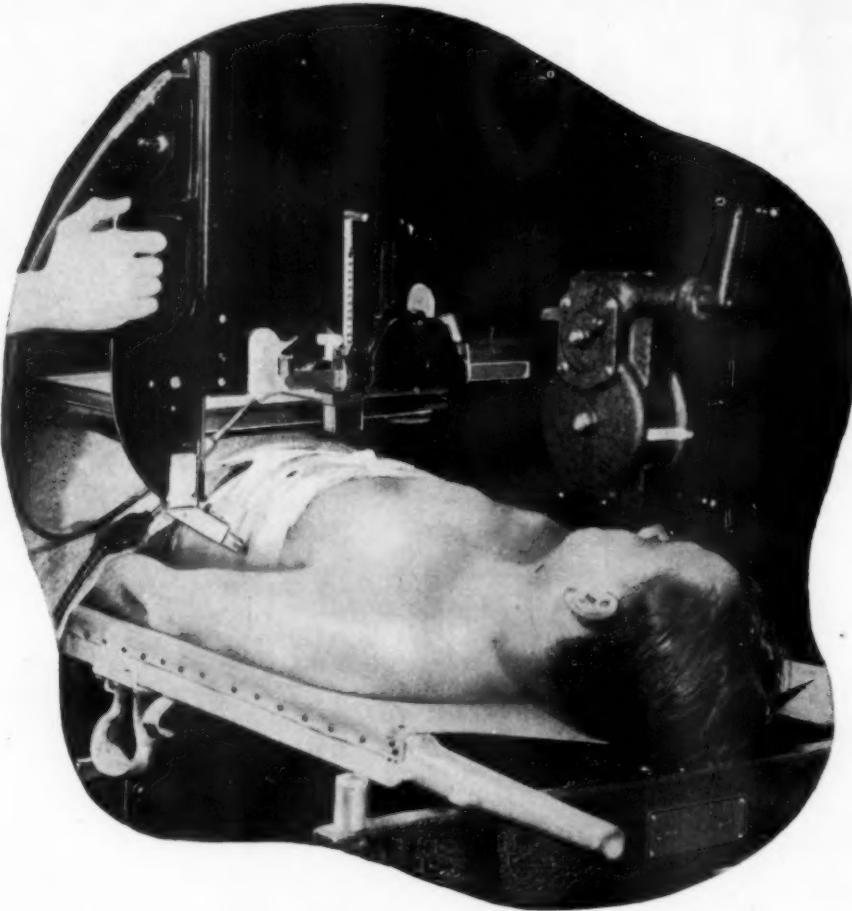
TRADITIONALLY a welder is surrounded by the haze of smoke. Now a portable Precipitron*, the electrostatic air cleaner, is used by industry to eliminate the welding smoke. The unit clears 600 cubic feet of air per minute.

COUNTING THUNDERBOLTS is the task of a new device which has been thrown into the campaign to protect power lines from damage by lightning. It consists of a saw-toothed and a straight-edged strip of metal foil between two layers of transparent plastic, and is about the size of a playing card. When lightning strikes a power line, a bit of the lightning is deflected to the foil, jumps the gap from one tooth to the straight-edge. In so doing it scorches a black spot on the plastic and also burns away that saw-tooth, so that the next discharge must travel by another path. No two teeth are the same size; each discharge picks the shortest path and thus is registered only once.

ARCHERY AND ELECTRONS are working together in that most modern of scientific instruments, the electron microscope. Quartz filaments 1/30,000 of an inch in diameter—one-sixteenth the thickness of a human hair—are used to calibrate the magnifying power of these microscopes. Westinghouse engineers have found that a modification of the medieval cross-bow is the simplest and most efficient device for drawing out molten quartz into such a filament before it can cool or harden.

Let us send you a free copy of the new booklet, "Books by Westinghouse Authors." Titles listed are not only in the fields of Electricity and Electronics—many of them standard texts—but also cover a wide variety of other subjects, from Astronomy to Sales Engineering. Ask for booklet SNL 84.

*Westinghouse trade mark.



Surgery by triangulation

The life of a soldier wounded by a bullet or shell fragment may depend on the speed with which the metal can be located and removed.

Today, in army field hospitals, *only one minute* is required to discover the fragment and locate it in two planes, incidentally giving the surgeon two points at which incision may be made and also the correct angles and depths beneath the skin.

This is made possible by the Westinghouse Bi-Plane Marker, a device which translates the conditions shown by the fluoroscope into "guide posts" for the surgeon's knife.

Used with the Bi-Plane Marker is the Re-orientating Device, which makes certain that the position of the patient on the operating table is exactly the same as during the fluoroscopic examination.

Bi-Plane Marker and Re-orientating Device were designed by Westinghouse x-ray engineers to meet requirements outlined by Colonel Alfred A. de Lorimier, Commandant of the Army School of Roentgenology, Memphis, Tennessee.

Westinghouse Electric & Manufacturing Co., Pittsburgh 30, Pa.

WESTINGHOUSE PRESENTS: *John Charles Thomas, Sunday 2:30, EWT, NBC.
"Ted Malone," Mon. Wed. Fri. 10:15, EWT, Blue Network*

Westinghouse
PLANTS IN 25 CITIES OFFICES EVERYWHERE

BIOLOGY

Artificial Fertilization

For the first time in medical history, human eggs have been developed outside of the body as far as the two-cell stage.

► FOR THE first time in medical history, human ovarian eggs have been fertilized outside the bodies of human mothers, and their development through the first two cell-division stages observed under the microscope. Accomplishment of this difficult feat in experimental biology is reported (*Science*, Aug. 4), by Dr. John Rock and Miss Miriam F. Menkin of the Harvard Medical School in Boston and the Free Hospital for Women at Brookline, Mass.

Three successful fertilizations of human eggs in glass dishes have been performed, two of them proceeding as far as the first cleavage, or two-cell stage of development, and the third showing three cells.

While this is far from realization of the ectogenesis, or "babies born in a bottle," about which imaginative zoologists romanced a couple of decades ago, it must be concluded as the first step in that direction. More soberly, the experiments have enabled scientists to observe, for the first time, some of the events of the first few hours of human prenatal existence, and may eventually open the way for better understanding of still-obscure points in embryology.

The human eggs for the experiments were obtained from the ovaries of women who found it necessary to lose them through surgery in order to save their own lives. Careful searching was needed

to find unfertilized eggs at the right stage for further development.

These were nourished on human blood serum in glass dishes, under close spermatozoa were released in the dishes, first supplied by the patients themselves, later by other women. Normal male spermatozoa were released in the dishes, and carried out the fertilization. The three-celled stage, and one of the two-celled stages, were subsequently fixed, stained and sectioned for closer microscopic work and for permanent preservation.

Artificially controlled manipulation of animal development from eggs began a half-century or so ago, when zoologists were able to produce fatherless worms, sea-urchins and even frogs by stimulating unfertilized eggs with chemicals, needle-scratches and electric current.

More recently, Dr. Gregory Pincus, now at Clark University, was able to remove unfertilized eggs of living rabbits and start development by similar procedures. He also succeeded in re-planting "ectofertilized" eggs in the bodies of foster-mother rabbits where they eventually came to normal birth.

Dr. Rock and Miss Menkin state that they received assistance from Dr. Pincus in their present series of experiments. They also state that a longer, illustrated report is in preparation, for later publication.

Science News Letter, August 12, 1944

in skin grafting operations has been the practically unavoidable infection of the tissues after the burned, dead flesh has sloughed off. On an average, about a quarter of a large grafted area fails to "take."

The four researchers, who had been using a sulfa-drug treatment with some success, decided to see if they could improve their score with penicillin. Accordingly, they gave heavy injections of the mold-drug to 17 very badly burned patients, at one- or two-hour intervals for from one-half day to five days before the grafting operation. The "take" score ranged from 90% to 100% of the total grafted areas, with the single exception of "an uncooperative alcohol addict," whose "take" was only 80%.

The penicillin seems to have had the effect of keeping the germs of infection at bay while the new tissue growth had a chance to take place, rather than of suppressing them entirely. Bacteriological examination of material taken from sample areas showed the germs still present, but apparently unable to start any mischief.

Science News Letter, August 12, 1944



EAR WARDEN—Lives will be saved by this new U. S. Navy defense weapon, because with this soft Neoprene device in his ears a sailor can hear commands while having his hearing protected against the terrific din of guns, motors and explosions. It is the product of research conducted under the auspices of the National Research Defense Committee at the University of California at Los Angeles and at Harvard University's Psycho-Acoustic Laboratory. This is an official Navy photograph.

MEDICINE

Better Skin Grafting

Another victory for penicillin, this time as an aid in keeping infection down after severe burns, has been achieved.

► PENICILLIN has scored yet another victory in the battle against death and disablement, this time as a powerful aid in getting large skin grafts to take hold on areas that have suffered deep and severe flesh burns.

The success is reported (*Journal, American Medical Association*, Aug. 5), by a four-man research team consisting

of Dr. J. W. Hirshfeld, Dr. M. A. Pilling, Dr. C. W. Buggs and Dr. W. E. Abbott, of Wayne University College of Medicine and the Detroit Receiving Hospital. The work was done under a contract between the Office of Scientific Research and Development and Wayne University.

One of the principal causes of failure

MEDICINE

Eat In a Crisis

Ulcer patients, when emotionally upset, should eat every hour or two to avoid a flare-up, hemorrhage, or perforation.

► IF YOUR best friend lets you down, if you make a tragic mistake, or if you receive bad news from your own sector of the war front—better raid the ice box right away.

This advice to eat in an emotional crisis is offered to all those who have had a stomach or duodenal ulcer by Dr. Walter C. Alvarez, of the Mayo Clinic. (*Journal, American Medical Association*, July 29)

Eat every hour or every two hours, especially between midnight and 3 a.m. and you may avoid a flare-up, hemorrhage, or perforation, Dr. Alvarez advises. You can easily set an alarm clock to wake yourself at midnight, perhaps, and again at 2 a.m.

Explaining the reasons for this advice, Dr. Alvarez says:

"A man of 50 who had always been well discovered one day that the man who for twenty years had been his brother-in-law, his closest friend and his business partner had been falsifying the books in order to steal from him. All that night he lay awake in great mental distress, and next day he had a big gastric hemorrhage.

"Another man, a physician, after examining a woman's stomach with a roentgenoscope (an X-ray apparatus for viewing the body on a screen), discovered that he had used a current of 60 milliamperes instead of the usual 3 milliamperes. After lying awake all

night worrying over the expected burn and resultant damage suit he found himself almost incapacitated by the pain of a bad ulcer.

"Another man, when a violent strike in his factory distressed him terribly, had a big hemorrhage. A woman who adored her peppery little daughter-in-law one day inadvertently offended her and brought down on her head a storm of abuse which nearly killed her. Next day a long-healed ulcer flared up and perforated. A woman who heard that her soldier husband had just been killed at the front promptly had a hemorrhage.

"Many such experiences will doubtless spring to the mind of every busy physician who reads these words, all illustrating what is well known today, namely that the patient with an ulcer is most in danger of a flare-up or a catastrophe during the hours immediately following a distressing emotional storm. Then is the time when, probably with an increase in the acid gastric secretion, and perhaps a decrease in the alkaline and neutralizing secretions that flow into the duodenum, or a combination of these two processes, the acidity of the contents of the first portion of the duodenum becomes so high that an ulcer either develops or, if present already, promptly becomes greatly deepened."

Science News Letter, August 12, 1944

AERONAUTICS

Feeder Line Airplane

► FIRST OF the new postwar planes to be designed especially for feeder-line operation is a high-wing, twin-engine, all-metal monoplane with a tricycle landing gear named the "Skybus." Intended for operation at a 5,000-foot altitude, the 24-passenger plane will cruise at speeds approaching 200 miles an hour. It can take off and land from small airports with 3,000-foot runways.

The new plane was designed by the Douglas Aircraft Company. The high wing makes cargo loading easier and

permits full downward vision for the passengers.

The cargo compartment door is exactly the height of truck-beds, facilitating easy, rapid loading of cargo and mail directly from the truck to the airplane. Passenger loading and unloading is speeded up by having two doors, one at each end of the cabin, making it possible for passengers to enter or leave the plane by either door, using steps which are carried with the plane in flight. Both of these new adaptations

reduce the time that the plane has to be on the ground.

The cabin interior is simple and modern in design. Wide windows take full advantage of the high-wing arrangement, affording maximum visibility for all passengers.

Equipped with two 700 horsepower engines, and a fuel capacity of 300 gallons, the new plane will have an operating range of 600 miles. This necessitates fewer fueling stops.

Science News Letter, August 12, 1944

SCIENCE NEWS LETTER

Vol. 46 AUGUST 12, 1944 No. 7

The weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., NOrth 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents. Monthly Overseas Edition: By first class mail to members of the U. S. armed forces overseas, \$1.25 a year. To others outside continental U. S. and Canada by first class mail where letter postage is 3 cents, \$1.25; where letter postage is 5 cents, \$1.50; by airmail, \$1.00 plus 12 times the half-ounce airmail rate from U. S. to destination.

Copyright, 1944, by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Entered as second class matter at the post-office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566; and 360 N. Michigan Ave., Chicago, STate 4439.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Edwin G. Conklin, American Philosophical Society; Otis W. Caldwell, Boyce Thompson Institute for Plant Research; Henry B. Ward, University of Illinois. Nominated by the National Academy of Sciences: Harlow Shapley, Harvard College Observatory; Warren H. Lewis, Wistar Institute; R. A. Millikan, California Institute of Technology. Nominated by the National Research Council: C. G. Abbot, Smithsonian Institution; Hugh S. Taylor, Princeton University; Ross G. Harrison, Yale University. Nominated by the Journalistic Profession: A. H. Kirchhofer, Buffalo Evening News; Neil H. Swanson, Executive Editor, Sun Papers; O. W. Riegel, Washington and Lee School of Journalism. Nominated by the E. W. Scripps Estate: Max B. Cook, Scripps Howard Newspapers; H. L. Smithton, Executive Agent of E. W. Scripps Trust; Frank R. Ford, Evansville Press.

Officers—President: Edwin G. Conklin. Vice President and Chairman of Executive Committee: Harlow Shapley. Treasurer: O. W. Riegel. Secretary: Watson Davis.

Staff—Director: Watson Davis. Writers: Frank Thone, Jane Stafford, Marjorie Van de Water, A. C. Monahan, Martha G. Morrow. Science Clubs of America: Joseph H. Kraus, Margaret E. Patterson. Photography: Fremont Davis. Sales and Advertising: Hallie Jenkins.

MEDICINE

Quinine Not Necessary

Atabrine is just as good, and perhaps better, for the control of malaria. There is no need now for large-scale production of quinine.

► ATABRINE is as good as quinine in control of malaria and better in some respects, there is no reason to replace it with quinine in the armed forces, and no need now for large-scale production of quinine or totaquine.

This is the substance of a resolution by the Board for the Coordination of Malarial Studies, just released through the National Research Council. Chairman of the board is Dr. R. F. Loeb, of Columbia University College of Physicians and Surgeons, Army, Navy, Public Health Service, Office of Scientific Research and Development and National Research Council representatives also serve on this board (*Journal, American Medical Association*, Aug. 5).

"No advantage, and possible disadvantage, would accrue to the armed forces were quinine or totaquine to replace quinacrine for the routine suppression and treatment of malaria," the resolution states.

Quinacrine hydrochloride is the official U. S. Pharmacopoeia title for atabrine, or atebrin as the board spells it in order to avoid using a trade name.

Totaquine is the U. S. Pharmacopoeia name for a mixture of the alkaloids of cinchona, the tree from which quinine is also obtained.

"The large-scale production of quinine or totaquine is not now considered a matter of importance for the management of malaria among Army and Navy personnel," the board also resolved.

A supply of totaquine in excess of present stockpiles may be needed, the board points out, for treatment of malaria among civilians in the reoccupied countries. It might not be possible to spread information on the proper use of quinacrine, or atabrine, immediately in such regions and therefore it would be more practical to supply totaquine.

"After the war the overall need for all established antimalarial drugs will continue to be great," the board adds. This seems to indicate that large-scale production of totaquine and the new laboratory-developed synthetic quinine might be favored in the future.

The board resolution, believed to be

the first official statement on malaria in the armed forces issued for some time past, is based on "controlled quantitative studies in civilian, Army and Navy establishments." According to these studies, quinacrine (atabrine) has "proved" to have all the antimalarial properties of quinine for suppressing malaria during and after exposure to infected mosquitoes.

Adverse effects, reported earlier, can be avoided by proper use of the drug. Suppression of malaria can be achieved over long periods without danger to the individual by proper use of atabrine, whereas adequate doses of quinine equivalent to those of atabrine now used by the armed forces would often produce symptoms of cinchonism, such as ringing in the ears, headache and so on.

Atabrine properly used, experience in the past two years has shown, is as ef-

fective as and safer than quinine for stopping an acute attack of malaria.

Atabrine, according to what the board terms "convincing evidence," cures the malignant form of malaria, known as falciparum, which quinine apparently does not do. Atabrine also suppresses symptoms of this type of malaria.

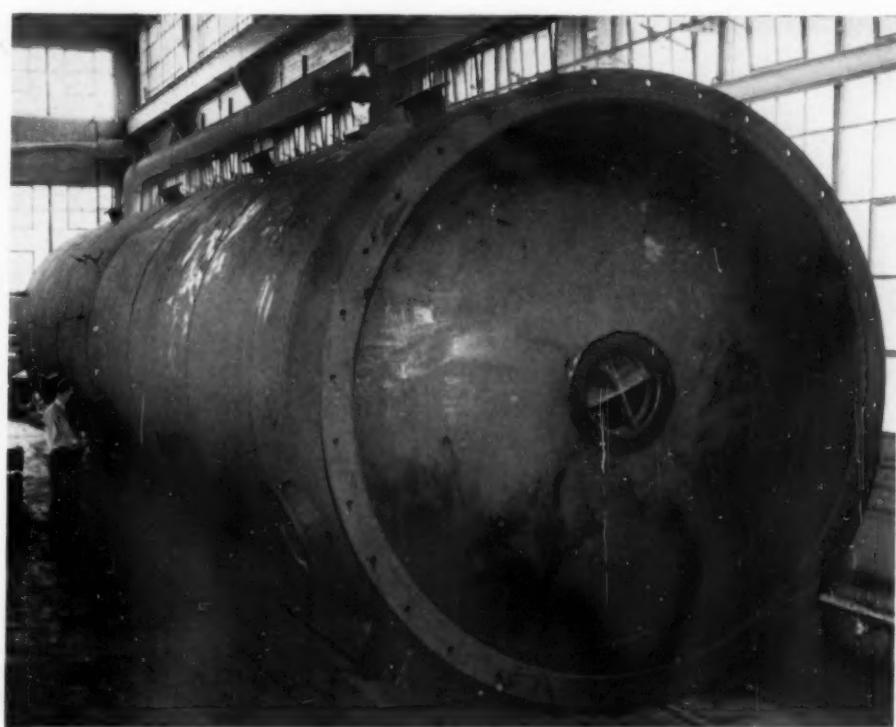
Science News Letter, August 12, 1944

CHEMISTRY

Rubber-lined Tank Holds Water Used in Explosives

► A NEW STEEL storage tank with a 43,000-gallon capacity and a one-inch wall will be used to hold highly purified water used in the manufacture of high explosives, TNT, smokeless powder, nitroglycerine and rocket powder as well as chemicals. It is completely lined with from five to seven tons of rubber, to eliminate any chance of corrosion which would contaminate the water.

The lining of the tank was accomplished by using long strips of rubber nearly a quarter of an inch thick. The rubber strips are bonded to the inside of the tank with rubber cement, then the seams are stitched by a machine to insure a perfect bonding. (*Turn page*)



43,000 GALLON TANK—Probably the largest rubber-lined tank, it is used for storing water necessary for the making of high explosives. The rubber lining (work of the United States Rubber Company) keeps the water from coming into contact with any metal.

MILITARY SCIENCE

The Army, Navy and Marines, as well as certain industrial companies, are using rubber linings in concrete storage tanks for holding high-octane gasoline. Rubber as a liner in these tanks prevents the destruction of the concrete caused by the sludge inhibitor found in all high-octane gases.

The use of rubber for tank linings was developed by the United States Rubber Company.

Science News Letter, August 12, 1944

AERONAUTICS

Airport That Grows Is Need for Post-War World

► AN AIRPORT that grows up with its town, from a simple grass-plot landing field to a super airport for handling big cargo and transport planes, is described by the Michigan Board of Aeronautics in a new publication.

The planning program for the airport is divided into six stages. The first stage consists of the purchase of a 120-acre plot, which is graded, drained, and seeded to give 1,800 to 2,000 feet of landing area in all directions. Hangars are built as they are needed. This type of airport will meet the needs of the average small community.

Starting with this master plan, additional construction is undertaken as the need for increased facilities becomes apparent.

In Stage Two, pavement is laid on two landing strips, and a taxiway and apron are added.

Two additional landing strips are added in Stage Three, bringing the total to four runways.

An additional 40 acres of land are required for Stage Four, designed to take care of limited airline operations. Also included are a basic administration building, pavement on the runway, and the addition of two diagonal runways.

Enlarging the airport to 200 acres, it is possible to extend the north-south and east-west runways to 3,500 feet, for regular airline operation. Also included in Stage Five are more hangars and facilities for handling passengers and cargo.

The final development of the airport, Stage Six, consists of widening all the runways, paving taxiways, and the addition of more hangars and the final units of the administration.

Science News Letter, August 12, 1944

Licorice growing was introduced into England from Syria about 400 years ago.

Barbs Instead of Bombs

Now being showered on enemy airfields and roads, these pieces of sharpened steel are disabling Axis aircraft and vehicles by gashing their tires.

► SHARP metal barbs are now being showered on enemy airfields and roads by Army Air Forces planes, disabling Axis aircraft and vehicles by gashing the precious surface of their tires.

Three types of metal barbs have been developed at the AAF Tactical Center, Orlando, Fla. The "Christmas tree" type is constructed from two pieces of sheet steel with serrated edges that make it look like a fish-hook. After stamping, each piece is bent and the two are welded together. The whole unit is about 3.5 inches long and resembles the branches of a yuletide tree.

Then there is the single barb, a pointed hollow tube about 3.5 inches long, mounted on a curved base containing a lead deposit. The weighted base makes it bob right back up like children's toy clown dolls. Since it is ef-

fective only on paved surfaces, it is used primarily on highways, and paved landing strips.

The "Big Boy" really has a murderous effect on tires. It is a four-pronged barb, 4 inches long. It consists of two hollow steel pointed tubes, bent in the middle and welded together at the bend to form the four prongs. Thus, it will always rest on three prongs, leaving one pointed up at a 90-degree angle to the ground.

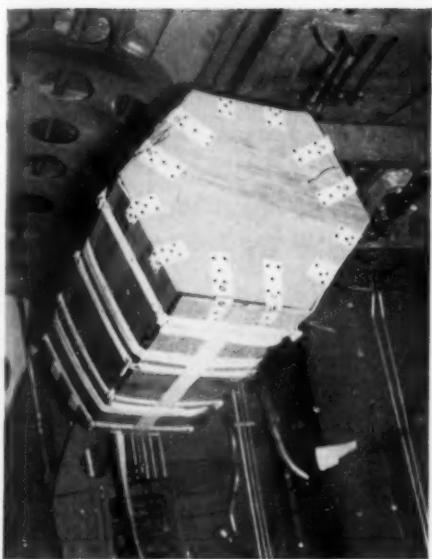
If you have ever experienced picking up a nail in an automobile tire, you can appreciate the effect thousands of these barbs dropped on an airfield or highway have on the Axis armies.

Here is how they are used. A group of bombers, loaded with hexagonal boxes made from plywood containing the metal barbs, instead of bombs, fly over enemy airfields and roads at low



DEATH FOR AXIS TIRES—When this deadly four inch, four-prong barb comes into contact with an enemy airplane tire, the result is a crack-up. Official Army Air Forces photograph.

► A heavy suing 493, g



NOT A BOMB—Containing tire-ripping barbs, the collapsible plywood box shown in this official Army Air Forces photograph, is as deadly as though it were filled with explosive. Once over an enemy airstrip, the pilot pulls the static line attached to the box, it collapses and the barbs are dispersed over a wide area, disabling aircraft and causing general confusion.

altitude. When they spot a target, such as enemy planes taking off, or motorized troops on the march or supply trucks, each plane showers the earth with barbed hail in an area 100 yards in diameter.

The resulting confusion means real chaos to the enemy. In the case of vehicles, the trucks pile up and much time must be consumed in making repairs and clearing the road of barbs before advance can be made. In the case of airfields, planes taking off or landing at high speed swerve violently and crack up into funeral pyres of flaming wreckage.

As many as ten Axis bombers have been destroyed at one time by the oversize carpet tacks, the cost to us being only a few pieces of sharpened steel. Not a round of ammunition is fired.

Science News Letter, August 12, 1944

ENGINEERING

Y-Gun Loading Mechanism For Submarine Pursuers

► A MECHANISM for loading the heavy Y-guns carried by submarine-pursuing craft is covered by patent 2,350,493, granted to Cecil P. Caulkins of New

London, Conn. A Y-gun is the device developed during World War I for the simultaneous launching of depth charges in opposite directions, while a third "ash can" is rolled down a rack on the stern of the vessel.

Mr. Caulkins' device is essentially an

inclined frame with a sliding carriage on which the heavy depth charge rests. This is raised from deck to muzzle level by winding up a cable with a crank. The inventor states that it is possible to complete the loading operation in 45 seconds with his mechanism.

Science News Letter, August 12, 1944

RADIO

Airwaves "Sleuths"

Axis spies and illegal radio station operators can no longer tamper with our broadcasting system, thanks to the Radio Intelligence Division.

► THE AIRWAVES of the United States are no longer a playground for Axis spies and illegal radio station operators, thanks to the vigilant ears and instruments of the Federal Communications Commission's sleuths of the airwaves, the Radio Intelligence Division. Two new scientific instruments, nicknamed "sniffer" and "watchdog," revealed by Stacy W. Norman, acting chief of RID, help the FCC cope with the many tricks employed by radio outlaws.

The "sniffer," announced Mr. Norman, is a portable, one-man direction finder that "smells out" by radio the very room in which an illegal radio transmitter is hidden. After the general location of any clandestine radio station which may dare to go on the air has been established, RID men sometimes find that it is situated in a warehouse, office building, or apartment house. The "sniffer" is then brought into use for close-in searching. Carrying the inconspicuous instrument, the RID man walks up and down the corridors of the building. When the radio detective reaches the room where the transmitter is located, the dial on the "sniffer" quickly points it out. The sniffer works like a portable radio receiver: the closer you get to the transmitter, the louder the signal comes in.

"The watchdog," Mr. Norman stated, "consists of a monitor and recorder that scans the entire radio spectrum, many thousand times the portion of the spectrum covered by the dial on the standard broadcast receiver. The instrument automatically records for immediate or future reference the beginning of any broadcast transmission in any area. Like a guard at a military post it stops and examines all stations that are broadcasting, passing by legitimate stations, pointing out illegal stations."

Prime weapon of the air-wave detectives is the Adcock Long Range Direction Finder, adapted and perfected for use of the RID by George E. Sterling, chief of the RID, and his associates. The unit consists of long H-shaped antennae that can be turned in any direction. This antennae is mounted on a 40-foot tower.

Like powerful ears, the antennae pick up signals of radio stations, often thousands of miles away. It can determine the approximate point of origin by balancing the signal. As in the case of a man who turns his head until he can hear the same sound in both ears, thus determining the direction of the sound, the long range direction finder locates the origin of the radio signal.

There are some 30 of these Adcock stations operating 24 hours a day in the United States, Puerto Rico, Hawaii and Alaska. Once a clandestine transmitter is picked up by one direction-finder, a message is sent by teletype to several other Adcock stations, which focus their attention on the transmitter. Each Adcock station promptly transmits the direction from which it is receiving the strongest signal to one of two RID Intelligence Centers, one located on the East Coast, the other on the West Coast. The reports on the clandestine transmitter are correlated and the bearings are projected, like the spokes of a wheel, centering on the hub which marks the exact location of the station.

Local RID representatives then take over, and with direction-finding equipment installed in automobiles and sniffers, they ferret out the exact spot where the transmitter is located. Since it is a Federal offense to operate an illegal or subversive radio station, arrests and prosecutions in court are handled by the Department of Justice.

Science News Letter, August 12, 1944

MEDICINE

DDT May Be Useful for Studying Nervous System

► DDT, POTENT insecticide and anti-louse chemical, may have still another use, that of aiding scientists studying the nervous system, it is suggested in a report by scientists of the Food, Drug and Cosmetic Administration (*Public Health Reports*).

The tremors of long duration produced in animals by DDT suggests this use of it as a scientific tool. Both tremors and liver damage in animals following DDT reported by the Food and Drug scientists have also been reported in studies by the U. S. Public Health Service.

The Food and Drug studies were made by Arthur A. Nelson, John H. Draize, Geoffrey Woodward, O. Garth Fitzhugh, R. Blackwell Smith, Jr., and Herbert O. Calvery.

Science News Letter, August 12, 1944

MEDICINE

Legion of Merit Awarded To Sandfly Fever Volunteers

► LEGION OF MERIT decorations have been awarded to 14 soldiers who volunteered to serve as human guinea pigs in a study of sandfly fever, the War Department has announced. The men all contracted the disease, either through the bites of virus-carrying insects or direct injections of blood from other patients. They have all recovered.

Sandfly fever is a malady with influenza-like symptoms prevalent in warm countries. Technically, it is known to medical men as phlebotomus fever. It is not contagious, and can be contracted only through the bite of a vicious little bloodsucking insect that has previously bitten a human patient. In this it is like malaria and yellow fever.

Fortunately, sandfly fever is not as dangerous as either of these two diseases. The initial fever, which may rise as high as 104 degrees, subsides after two or three days, but the patient remains incapacitated for a week or two.

Two effective repellents have been developed, which drive off attacking sandflies. One is dimethyl phthalate, the other a vanishing cream containing pyrethrum. (See *SNL*, July 15, p. 40).

One of the useful facts learned from studies on the 14 volunteers is that an attack of the variety of sandfly fever prevalent in Sicily will confer immunity against the virus of the fever as it occurs in Egypt. Soldiers who had submitted to an attack of the Sicilian variety were inoculated with the Egyptian virus after recovery, and failed to develop new attacks.

Science News Letter, August 12, 1944

NUTRITION

Babies Will Be Healthier Through Nutrition Research

► MORE ROBUST health for several million babies in the United States alone may result from some of the scientific studies supported by the Nutrition Foundation in New York, according to the latest report of its scientific director, Dr. Charles Glen King.

The sum of \$1,500,000 has been contributed to the Foundation during the past two years by 42 food and related manufacturers, its president, George A. Sloan, reported. Of this, \$530,040 has been appropriated for 87 research grants.

Primary emphasis has been placed on research of interest to the armed forces, but the studies are also laying "an excellent foundation for improving maternal and infant feeding," Dr. King stated.

"According to the best evidence available," he said, "better food consumption by mothers before infants are born would mean within a single decade in the United States alone, several millions of infants in more robust health. An estimate of the number of infants that might be shifted from a 'poor health' to a 'good health' classification during the first two weeks of life by means of their mothers' eating better food actually falls in the range of 900,000 per year."

Science News Letter, August 12, 1944

INVENTION

Pivoted Jack Attached Permanently to Car's Axles

► PESSIMISM might be the term applied to the invention on which Juan F. Fanes of Mexico City received patent 2,353,021, for its basic idea is to have a pivoted jack permanently attached to each end of a motor vehicle's axles, ready to be swung down when the inevitable blowout or puncture occurs. Lifting power is supplied by an engine-operated hydraulic system. The lower end of the jack is provided with two small wheels or rollers, so that the vehicle may be towed if repairs on the spot are not practicable.

Science News Letter, August 12, 1944

IN SCIENCE

CHEMISTRY

Levulose Now Made from Dextrose by Invention

► TURNING DEXTROSE, which is only three-quarters as sweet as cane sugar, into levulose, which is half again as sweet, is the chemical achievement that won patent 2,354,664 for two chemists employed by the Corn Products Refining Company, Dr. Sidney M. Cantor and Kenneth C. Hobbs. They have assigned their patent rights to the employing firm.

Dextrose has long been made in huge quantities by treating starch with dilute hydrochloric acid. The two chemists change the less-sweet sugar into its sweeter twin by putting the syrup containing it over an alkaline catalyst, preferably calcium hydroxide, and then neutralizing it again with a little more acid. Care must be taken, they state, to prevent the formation of another sugar, mannose, which tastes bitter to many persons.

Science News Letter, August 12, 1944

ORDNANCE

Invention Sets Fuses Within Gun Chamber

► A RADICAL idea for the setting of time fuses on shells is the subject of patent 2,353,816, issued to M. L. Dodge and W. V. Baker of Seattle. On all time shells used nowadays, the fuse is first set in a separate mechanism, usually alongside of the gun, then shoved into the breech and fired. In the Dodge-Baker invention, the fuse-setting is accomplished within the gun itself, cutting down the chances of inaccuracy due to the time-lag involved in separate setting, loading and firing.

The system can be used only with shell set in a metallic cartridge case, for this case serves as part of the setting mechanism. The shell itself is held fixed by seating its rotating band against the bases of the lands in the rifling. The base of the shell, held by the top edge of the cartridge case, can be turned, setting the fuse for the desired time interval. A toothed ring near the base of the cartridge case is engaged by the fuse-setting gear built into the gun breech.

Science News Letter, August 12, 1944

SCIENCE FIELDS

BACTERIOLOGY

**Germ-Stopping Substance
In Soil Microorganisms**

► A NEW germ-stopping substance, belonging to the same "family" as penicillin and known as streptomycin, has been identified by a group of four research workers at the New Jersey Agricultural Experiment Station: Miss Doris Jones, H. J. Metzger, Albert Schatz and Dr. Selman A. Waksman.

Streptomycin proved able, in laboratory experiments on embryo chicks, to prevent the growth of several bacterial species that have been found more or less resistant to previously known germ-stopping substances extracted from molds and other microorganisms growing in the soil. Among these were the germs of fowl pneumonia and spontaneous abortion.

Science News Letter, August 12, 1944

PLANT PHYSIOLOGY

**Mold Serves in Testing
Plants' Food Requirements**

► AN EASILY grown mold, a kind of botanical second cousin to the one that is the source of penicillin, has been found to be a good test plant for the food materials needed by crop and garden plants, in experiments carried on at the U. S. Department of Agriculture laboratories at Beltsville, Md.

It has been found that the same mineral elements that are needed by the familiar green plants are also needed by this mold species, with only three exceptions: calcium, silicon and boron. For all the rest, it appears to be able to function in plant nutrition research very much as white rats do in experiments on human diets; because it likes and needs the same things, and at the same time is small, cheap and easily raised, it can be economically used in long series of tests that would be very costly in space and money if they had to be conducted full-scale on the larger organisms.

For example, when the mold was fed on a nutrient solution containing all the necessary elements except nitrogen, it failed 100%. On phosphorus- and magnesium-free diets its failure was quite as complete, and on a "minus-sulfur"

nutrient medium was nearly so—98%.

Experimental value of the mold will probably be greatest in connection with the so-called trace elements—things like molybdenum, zinc and copper, which are needed by plants in only a few parts per million of their total nutrient-solution intake.

The mold belongs to one of the most familiar groups of food- and clothing-spoiling organisms, *Aspergillus niger*.

Science News Letter, August 12, 1944

MEDICINE

**Men Rejected by Army for
Syphilis Can Be Reclaimed**

► NEARLY two-fifths of the men called up for war duty but rejected when blood tests showed them to be syphilitic can be reclaimed by treatment and enabled to pass the entrance tests, statistical studies by the U. S. Public Health Service indicate.

Out of the first 15,000,000 registrants, 720,000 were refused on account of syphilis. Of this group, a large sampling of 182,607 cases was followed through by Selective Service boards, state and local health authorities, and the Army and Navy. It was found possible to trace 93% of all cases.

Venereal disease control programs have already been responsible for the acceptance for duty of 18% of the men under study, and an additional 20% have been declared available for service after follow-up and treatment when necessary. Further treatment was indicated as necessary for 16%.

Of the remaining 46%, there is no chance for acceptance of 16%, either because the disease had progressed too far or because of other physical defects. The rest have either moved, died or are in mental hospitals.

Science News Letter, August 12, 1944

PLANT PATHOLOGY

**Virus Disease Found
Attacking Lettuce**

► BRITAIN's summer salads are endangered by a newly-discovered virus disease that destructively attacks lettuce, B. Kassanis of the Rothamsted Experimental Station reports (*Nature*, July 1). Dead areas appear in the leaves, soon rendering the plants worthless.

The virus has also been found attacking the leaves of common dandelion, which is a botanical cousin of lettuce. The virus is carried by the aphid.

Science News Letter, August 12, 1944

BOTANY

**Wild Fig Leaves May Help
The Shoe Leather Business**

► THREE-QUARTERS of a ton of tannin to help tan the nation's shoe leather, could be squeezed out of the thick, fleshy leaves of one acre of the wild fig-marigold as it grows on the coast of California, (*Plant Physiology*, April).

Resistant to drought, poor soil, and some frost, it would make a good commercial source of tannic acid, suggest Thomas Yort Hum and Robertson Pratt, investigators at the College of Pharmacy, University of California. They found that the leaves of the fig-marigold, or Hottentot fig plant, yield 19.4% tannin, essential in manufacturing drugs and inks as well as leather goods.

These investigations are part of a nation-wide search for a domestic source of tannic acid carried on ever since the chestnut blight in the 1920's in this country. The cutting off of our supply from Spain, Italy, and Greece by the war has made the search more imperative.

Buttonwood tree, mangrove, saw palmetto and canaire are other sources being considered.

Science News Letter, August 12, 1944

ENGINEERING

**Bituminized-Fiber Pipe
May Become Permanent**

► WARTIME USES of bituminized-fiber pipe for drainage and sewage disposal, as a substitute for critical metals, have proved so satisfactory that such uses will probably continue in postwar days. This pipe is made of coal tar pitch reinforced with an interwoven fibrous structure.

Some of the desirable properties of bituminized-fiber pipe are strength, durability, lightness, resistance to corrosion and low installation costs. It has the ability to bend with shifting earth instead of cracking. This type of pipe has long been used as a protective conduit for underground electric cables.

Commercial standards for bituminized-fiber pipe have been issued by the National Bureau of Standards in recognition of its probable future uses. It establishes construction and performance requirements that the industry believes will insure a satisfactory pipe for many drainage purposes.

Science News Letter, August 12, 1944

AERONAUTICS

Giants of the Sky

Convenience, speed, and ease will mark the post-war luxury airliner which will fly across the United States in less than 10 hours.

By ROBERT N. FARR

See Front Cover

► THE postwar luxury airliner will fly across the United States in less than 10 hours, or from Boston to Moscow, a distance of 5000 miles, in 18 hours. No spot on earth will be more than 60 hours away from your living room.

Half again as big as today's large plane, tomorrow's giant airliner will weigh up to 125 tons. Four to six engines will thrust it through the sky at speeds greater than 300 miles an hour. Such a giant is the "Model 39" shown on the front cover of this SCIENCE NEWS LETTER in a Consolidated Vultee Aircraft Corporation photograph.

The new planes will stand so high that they will require an elevator or escalator to get into them. Already planes are coming off the production lines that are as tall as a three-story building. A small cottage could be built under one of the wings of these sky giants.

Many of the long-distance postwar airliners will have two or three decks, taking care of 60 or more passengers. The actual cabin will have from two to eight separate sections and be as large as a five- or six-room house.

Passenger comfort and convenience are prime considerations for manufacturers and designers working today on the airplanes of the future. Safety is now practically taken for granted, as a result of great advances in engineering.

New seating and sleeping arrangements, more space for passengers and baggage, wide use of lightweight plastics—these and dozens of other improvements are being created for the spacious planes you will ride in after the war.

New Passenger Seats

One of the outstanding features of the future airliner will be new passenger seats. Their design is derived from the wing chair familiar to family living rooms. An individual reading light is built into the left wing, so spotted that it falls directly on your lap. The other wing of the chair houses a "pillow ra-

dio" which permits the passenger to hear programs without annoying those about him.

Seat upholstering conforms to the body's contours. When the passenger presses a button, the back reclines and the seat slips forward, dropping slightly at the rear to allow a more comfortable lounging position.

These chairs, arranged in a series of four, can be converted into sleeper berths at night.

The toilet facilities offer convenience unknown in prewar planes. The women's powder room, for example, has a whole wall covered with a plastic mirror.

One of the first of the new postwar airliners is already being test-flown. It is the Consolidated Model 39, designed by Henry Dreyfuss, industrial designer and consultant of New York.

Riding on an escalator that takes you nearly 20 feet up to the passengers' entrance in the exact center of one side of the plane, you step through two sliding doors, built into the hull, which open like those of an elevator.

Upon entering, you find yourself in a small lobby, faced with a giant air map of the route you will travel. The hostess, one of a crew of six, takes your coat and hat and places them in recessed closets built on either side of the entrance. Your luggage is stored in a compartment behind the map.

The cabin is divided into two sections, one fore and one aft. In the forward section there are 24 seats, in the aft section there are 22 seats. There are three toilets, a large galley, and a special "club car of the clouds" section, made up of four seats near the galley.

The use of color has been given especial attention. Warm gray and rust brown, or wood brown and soft green are combined to give you a greater sense of psychological security.

A modern idea in visual comfort in



SPACIOUS BERTH—Just one of the inviting features of the airlines of the future is the spacious berth with the polaroid windows which can be adjusted to admit any degree of light.

the form of polaroid windows allow you to select variable densities of light, from bright sunlight to complete darkness.

If you want privacy while in flight, special private compartments can be easily formed by using temporary panels.

At night your sleeping berth is wider and longer than the standard Pullman berth, though it operates in a similar manner, with upper and lower. The upper berth swings down from the ceiling. In daytime the lightweight bedding materials and light-proof privacy curtains are stored in the closed upper berth.

Like Liberator Bomber

This luxury airliner is similar to the Consolidated Liberator bomber in design. It is typical of the one in which you will fly. With a top speed of 270 miles an hour, and a range of 4,000 miles, some of these planes will carry 52 passengers and baggage over the longest ocean trade-routes without stopping.

It is probable that airline travel will break itself down into five logical types of service. Each type of service will be designed to fill special needs, and will use a different type of plane.

Small 14-passenger Lockheed "Lodestars" will probably be used for feeder service that stops every 25 to 30 miles to pick up passengers, serving small communities, and taking passengers and cargo to mainline points.

For local service that makes stops every 150 to 200 miles, connecting with feeder lines, 21-passenger Douglas DC-3's may be used.

Larger planes like the Boeing Stratoliner, which carries 33 day passengers and sleeps 25 at night, will be used for limited stop service, connecting major cities and industrial centers.

Long-distance Flying

The big planes of the future, designed for long-distance, high-speed flying, will be used for international and intercontinental service, flying from London to New York, Los Angeles to Hong Kong, Chicago to Buenos Aires, as well as to and from other world centers in a matter of hours.

Giant "flying box cars" or cargo planes will provide fast, regular service between all major points on the globe.

The final objective is a completely integrated air transportation system in which each of the five types of service works with the others.

A ship can drop anchor anywhere it likes, but an airplane needs a suitable landing field. New and better airports will be needed in many communities that are destined to become essential ports of call. Less than 20 per cent of the present airports in the United States can accommodate the big sky giants of the future.

Airports must be built closer to the center of the community, for the convenience of passengers. Today, many cities are separated by a flight of only a few hours, but an hour or more may

be frittered away travelling to and from the airports. Good examples of this are the conditions in St. Louis and Chicago. It takes a person 108 minutes to fly from St. Louis to Chicago, but 110 minutes of travel time are used up in the few miles between airports and downtown business sections.

The question of suitable airport facilities is a big one, and though much thought is being given to the problem by the Civil Aeronautics Administration and other public and private agencies, it may take so long (*Turn to next page*)



Experience Shared . . . Production Multiplied

When war came to this nation, even the greatly expanded facilities of Bausch & Lomb could not meet the urgent demands for binoculars as well as the range finders and other military instruments which only this company was equipped to produce. There was a tremendously increased need, too, for optical instruments of the utmost precision for industrial research and control . . . that our fighting men might have fighting tools second to none.

Faced with this situation, Bausch & Lomb at once increased its own binocular production more than twelve hundred percent and multiplied its effectiveness by making its specifications and production experience available to six other manufacturers.

In addition, the Bausch & Lomb glass

plant makes and supplies the fine optical glass which goes into lenses and prisms not only of the binoculars this company manufactures, but into others as well.

Thus, through the expansion of its glass plant and the sharing of its knowledge and experience in binocular manufacture, Bausch & Lomb is making possible an uninterrupted supply of these optical instruments for America's Armed Forces.

BAUSCH & LOMB

OPTICAL CO., ROCHESTER, N.Y.



Makers of Optical Glass and a Complete Line of Optical Instruments for Military Use, Education, Research, Industry and Eyesight Correction and Conservation

Do You Know?

Rice fields in California are planted from airplanes.

Ants can be controlled indoors by the use of thallium sulfate.

Australia raised 450,000 turkeys last season for American soldiers.

Swordfish, which sometimes grow to 12 feet in length, are tiny fish about an inch long when first hatched.

Helicopter service has been authorized in Mexico by the government to connect remote communities with the country's chief airlines and airports.

Nicotine serves an important role in insect control because it has the unique properties of being a contact poison, stomach poison and fumigant.

The recent eruption of *Vesuvius* has put 50,000 acres of farmland out of use for this year and rendered 200,000 acres fit for partial use only.

Zein, now produced in commercial quantities, is a protein extracted from corn; dissolved in alcohol, it forms a lacquer-like solution usable as a substitute for shellac.

Ingredients of aviation fuel, synthetic rubber and TNT are quickly determined by a new *optical method* by passing infra-red beams through samples; certain wavelengths are absorbed by various ingredients.

A *mallard duck* in the Philadelphia zoo stole away from her home, hatched a brood of ducklings on the bank of a nearby river, and later proudly marched her new family back to the zoo through the main entrance gate.

Two sprays to control the American dog tick, or *common wood tick*, have been developed by the U. S. Department of Agriculture; one uses nicotine sulfate, the other a three-to-one mixture of sodium fluoride and nicotine sulfate.

Mexican bananas may soon become more plentiful in the United States because of two 2,000-ton American vessels chartered to Mexico to carry bananas from Mexican ports to Brownsville, Texas, and general cargo southward.

From page 107

to build suitable airports that the post-war air age will be delayed.

The end of the war will bring us a long step nearer the accomplishment of the airplane's real purpose—the rapid transportation of commerce over the face of the globe. No other instrument

AERONAUTICS

Jet Propulsion for Gliders

May eliminate other methods of launching if it proves practicable. The one big disadvantage is the additional weight of the motor.

► JET PROPULSION motors may eliminate other methods of launching motorless planes or gliders, if this method proves practicable. Such a motor was tried out in conjunction with an address by Zbigniew Krzywoblocki, instructor at the Polytechnic Institute of Brooklyn, at a meeting of the Soaring Society of America in Brooklyn.

Mr. Krzywoblocki stated that successful powder-rocket flights had been performed with gliders as early as 1928 in Germany and in 1931 in Italy. No glider, however, has ever taken to the air with a jet motor.

Jet-propulsion motors might make it possible for gliders to take off from a level hilltop or from flat ground, and for horizontal flight, where no gain in altitude is required, without automobile, plane, or winch towing, or shockcord launching. One big disadvantage of jet-propulsion motors for gliders is the additional weight of the motor.

The combustion chamber of the jet motor may be placed in the wings, and the fuel tanks may be placed in the wings or fuselage. Mr. Krzywoblocki pointed out that jet propulsion calls for an elaborate installation and is difficult to operate.

Zygmund Fonberg, consulting engineer, built the model jet-propulsion engine demonstrated at the conference. The engine, mounted on a restraining structure to prevent it from "taking off" was actually started and allowed to run for some time.

Science News Letter, August 12, 1944

Gliders Are Valuable

► THE SUCCESSFUL operation of motorless planes or gliders, in the airborne invasion of Normandy, as well

ever invented by man has a greater chance of creating international good will. Yesterday we were a world of separate nations, protected by distances that no longer exist and seas that have been narrowed to millponds. Today our nearness makes us all members of the Family of Nations.

Science News Letter, August 12, 1944

as earlier military operations, has established them as valuable tactical weapons of air warfare, reported Major Eliot F. Noyes, of the Army Air Forces, at the meeting.

"Beyond any doubt, the glider has now been accepted as a tactical weapon of great military importance. Gliders have now been used tactically in a variety of ways, but this is still a new weapon. The extent of its tactical possibilities is not known, and will not be discovered without further use in actual theaters," Major Noyes stated.

Military gliders, he indicated, were designed to carry troops and equipment into battle. The glider is a large container that can land in small unprepared areas in which a transport plane cannot land. It can carry larger loads of men or equipment than can be dropped by parachute. It can be retrieved either loaded or empty.

Most important use of gliders, Maj. Noyes advised, is the airborne attack, as used in the invasions of Crete, Sicily and Normandy. Large numbers of gliders are used, flying probably in darkness or half-light. Such an operation is designed to land troops who will vertically outflank the enemy, seize communications points and disrupt the enemy's rear lines, making it difficult for him to bring up reserves while a ground attack is in progress.

A second important use is the establishment of an airhead behind enemy lines, as was done in Burma by Col. Cochran's Air Commandos. The important difference between this and the Normandy invasion, Maj. Noyes pointed out, lies in the fact that in Burma the airborne force (*Turn to page 110*)

"Thanks for
your assistance
In helping with
Long Distance"



When Long Distance lines are crowded and the operator asks you to "Please limit your call to 5 minutes"—it's nice to hear you say, "I'll be glad to."

The request is usually made during rush hours on lines in and out of war-busy centers. It's a suggestion that helps everybody get better service.

BELL TELEPHONE SYSTEM



comprised the entire assault, penetrating 150 miles into Jap territory. It was not the mere sealing off of an area where ground or seaborne troops would later attack.

Gliders are also used by the enemy in airborne raid operations, Maj. Noyes went on. "The Germans' use of gliders has been mainly in raid operations . . . Mussolini was rescued by troops that landed from gliders, and the surprise attack on Marshal Tito's headquarters in Yugoslavia was again largely a glider-borne force."

Foreseeing new applications for the glider, Maj. Noyes pointed out that ". . . utility possibilities include the evacuation glider which carries wounded, and the various field dressing stations which can be neatly packed for delivery by glider . . . standard field kitchens which would enable one glider load to serve 150 men with hot food . . . portable radio detection stations and weather stations which can be carried with their crews to any point within flying range for special reporting missions."

"There is obviously no limit to these possibilities, and we may soon see all sorts of service units provided by glider to front line outfits such as shower units, clothing and shoe repair shops, refrigeration units, and so forth," he concluded.

Science News Letter, August 12, 1944

Better Powered Planes

► EXPERIMENTS made with motorless planes or gliders will result in the greater refinement of powered airplanes, Charles Gale, one of the founders of the Soaring Society of America, stated in an interview.

At the low speed at which a glider flies, the pilot can note many things about the design and construction of the plane which could not be readily discovered in a power plane travelling at high speed, Mr. Gale pointed out. An aeronautical engineer equipped with measuring instruments could determine in a glider flight under actual flying conditions facts that are only approximated by models in wind tunnels.

"Soaring as a sport will return after the war," he predicted, "and there is every indication that there will be commercial applications of the technique, equipment and practices which have been evolved through the use of military gliders."

Science News Letter, August 12, 1944

Five factories in the United States are now producing helium gas.

PLANT PATHOLOGY

NATURE RAMBLINGS
by Frank Thone

A Sick Sadness

► PRACTICALLY all orange, grapefruit and tangerine trees in the United States and other major citrus-growing countries may be seriously menaced by a disease that is already known in South America, South Africa and Java, and that may become world-wide. It has been carefully studied by Prof. H. J. Webber of the California Citrus Experiment Station at Riverside, California, whose report was published as a translation in Portuguese in Brazil before it appeared in English in the United States.

Although trees were dying of this disorder in South Africa 40 years ago, its serious nature was not recognized until it appeared in Argentina and Brazil. There it was given the name "tristeza," which in both Portuguese and Spanish means sadness or melancholy. Prof. Webber suggests this name as appropriate for general adoption.

Tristeza is one of the most baffling diseases which plant pathologists have ever studied. It affects only grafted trees, and then only one particular type of graft, wherein orange, grapefruit or tangerine cions are set on sour-orange stocks. Similarly grafted lemons remain unaffected. No virus or other disease germ has yet been identified as its cause, neither has any insect or other possible carrier been placed under indictment.

Sour orange, a wholly inedible species of citrus, has become the most widely used of grafting stocks because its roots are more resistant to certain soil harbored diseases than those of the commercially valuable species which are grafted on it. But if young orange, grapefruit or tangerine trees with sour-orange roots are set out in a tristeza-infested region, growth stops in two or three years and the roots die. Yet the

same species growing on their own roots show no sign of tristeza, nor do sour-orange trees that have been permitted to bear their own tops instead of the grafted-on cions.

Various theories have been proposed to account for the strange behavior of this disease. Prof. Webber's own theory is that the cause is a virus, which is held in check by some substance produced in the leaves of sour orange and lemon, but absent, or present in inadequate quantity, in the susceptible citrus species.

Tristeza has not yet been found in the citrus-growing areas of the United States or in the Mediterranean countries, but there is no assurance that it will not appear in either of these regions. If it does, total disaster can be averted by converting the orange groves into lemon groves by top-grafting, since lemons confer immunity. Diseased trees may also be saved by transferring them onto resistant stocks, such as the rough lemon: seedlings of the rough lemon are planted at the base of the old tree and their tops are grafted into the trunk of the diseased tree above the sour orange stock.

Science News Letter, August 12, 1944

INVENTION

Oat Flour in Ice Cream Improves "Eating Texture"

► AN ICE CREAM that ought to be popular in Scotland is the subject of patent 2,355,032, granted to Sidney Musher of New York. An essential ingredient is very finely ground oat flour, which the inventor states prevents the formation of objectionable ice crystals and at the same time improves the "eating texture" of the product.

Mr. Musher has also taken out several other patents on products incorporating oat flour, including one plastic.

Science News Letter, August 12, 1944

MATHEMATICS DICTIONARY

Invaluable in reading any book that uses mathematics.

The James Mathematics Dictionary

The only such book now published, provides standard definitions of the terms and phrases from arithmetic through elementary differential equations, the technical terms ordinarily used in the applications of these subjects, and more advanced basic terms. Easy examples, many illustrations and all sorts of formulas are included. The appendix contains tables of weights and measures, a list of mathematical symbols and tables ordinarily used in handbooks.

This dictionary is a great deal more than a collection of definitions. It explains, illustrates and correlates, stressing especially those operations that are hardest to understand. One reader has called it "Ten texts in one." Second printing of Revised Edition, just off the press. Blue fabric binding, for \$3.00, from the Digest Press, Van Nuys, California, or *Science News Letter*.

ENGINEERING—MATHEMATICS

Giant New Calculator

This automatic sequence controlled mathematical robot will save many man-hours and solve problems heretofore too intricate for solution.

A GIGANTIC mathematical robot, described as "the world's greatest calculating machine," is going into the war service of the U. S. Navy at Harvard University after its presentation to Harvard by the International Business Machines Corporation.

Completely new in principle and unlike any calculator previously built, this 51 by 8 foot calculator is the result of two years of basic theory research by its inventor, Commander Howard H. Aiken, U.S.N.R. and six more years of design, construction and testing at the IBM engineering laboratory at Endicott, N. Y.

This automatic sequence controlled calculator, as it is called, was accepted at ceremonies by President James B. Conant of Harvard as a gift from President Thomas J. Watson of IBM.

For the present this new algebraic superbrain will be devoted to war problems, but when the Navy no longer needs it it will explore vast fields in pure and applied mathematics and other sciences and produce answers to problems so intricate and time-consuming that they have only very tedious solutions.

The machine can add or subtract in a third of a second, and the elementary operation of determining sine x, an operation unique to this machine, takes only 88 seconds, for example.

One typical problem was solved by this machine in 19 hours, whereas it took four expert girls three weeks to do the same work, using ordinary office calculators.

A steel frame 51 feet long and 8 feet high holds the calculator, which consists of an interlocking panel of small gears, counters, switches and control circuits, all only a few inches in depth. Five hundred miles of wire with 3,000,000 connections, 3,500 multipole relays with 35,000 contacts, 2,225 counters, 1,464 tenpole switches, and tiers of 72 adding machines, each with 23 significant numbers, are used in the machine.

One of the problems scheduled for the machine when it returns to civilian use is the solution of the dynamic equations of the solar system, never solved

because of their intricacy and the enormous time and manpower required. Atomic physics, radio research, investigations of the ionosphere, actuarial work, optics, and electronics will also benefit immensely. Many mathematics functions defined by infinite series or infinite processes, useful in physics, chemistry, engineering and pure mathematics, await tabulation.

Commander Aiken, now on leave as associate professor of applied mathematics in the Harvard Graduate School of Engineering, was assisted by Robert V. D. Campbell, now Ensign Campbell, U.S.N.R., during the latter years of the construction of the machine. Clair D. Lake of IBM directed the machine's construction jointly with Commander Aiken and they were assisted in design by Frank E. Hamilton and Benjamin M. Durfee of IBM.

The intricate mechanism is controlled by paper tape into which are punched the data to be handled. One feature of the operation is that there can be built up a library of these tapes that can be used in connection with future problems.

Science News Letter, August 12, 1944

Books Off the Press

THE BUSINESS OF GETTING WELL—Marshall Sprague—*Crowell*, 143 p., \$1.75.
BY SEA AND BY LAND—Earl Burton—*Whittlesey*, 218 p., illus., \$2.75.

CASE STUDIES IN THE PSYCHOPATHOLOGY OF CRIME—Benjamin Karpman—*Medical Science Press*, Vol. 2, \$16. Independent of Vol. 1. New cases, new research.

CHECKLIST OF THE COLEOPTEROUS INSECTS OF MEXICO, CENTRAL AMERICA, THE WEST INDIES, AND SOUTH AMERICA—R. E. Blackwelder, Comp.—*Govt. Printing Office*, 341 p., paper, 30 cents. Smithsonian Inst., Bulletin 185.

CHINA—A. G. Weiley and John A. Pope—*Smithsonian Inst.*, 85 p., paper, illus., 25c. War Background Studies, No. 20.

ELECTRICAL TECHNOLOGY AND THE PUBLIC INTEREST: A Study of Our National Policy Toward the Development and Application of Inventions—Frank J. Kottke—*Am. Council on Public Affairs*, 199 p., paper, \$2.50.

ENJOY YOUR HOUSE PLANTS—Dorothy H. Jenkins and Helen Van Pelt Wilson—*Barrows*, 238 p., illus., \$2.50.

FOREIGN MAPS—Everett C. Olson and

Agnes Whitmarsh—*Harper*, 237 p., \$4. Harper's Geoscience Series.

A GUIDE TO NAVAL STRATEGY—Bernard Brodie—*Princeton Univ. Press*, 314 p., \$2.75.

HOW TO SOLVE PROBLEMS IN PHYSICAL CHEMISTRY—Joseph A. Babor and Garrett W. Thiessen—*Crowell*, 214 p., paper, illus., \$1.25.

INTRODUCTION TO QUANTITATIVE ANALYSIS—Saul B. Arenson and George Rieschel, Jr.—*Crowell*, 386 p., illus., \$2.75.

MERCHANT SHIPS 1943: Founded, Compiled, Drawn and Edited—E. C. Talbot-Booth and E. B. R. Sargent—*Macmillan*, illus., \$19.

MODERN WOOD ADHESIVES—Thomas D. Perry—*Pitman*, 208 p., illus., \$3.

PACKAGING CATALOG, 1944—*Packaging Catalog Corp.*, 766 p., illus., \$2.50.

PRACTICAL PSYCHOLOGY—F. K. Berrien—*Macmillan*, 584 p., illus., \$4.

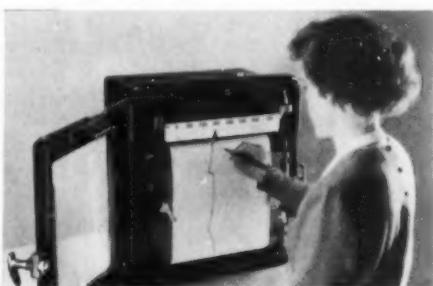
SEWING FOR THE BABY—*Barrows*, 293 p., illus., \$1.98.

SPEED IN ANIMALS: Their Specialization for Running and Leaping—A. Brazier Howell—*Univ. of Chicago Press*, 270 p., illus., \$4.

WOOD CHEMISTRY—Louis E. Wise, ed.—*Reinhold*, 900 p., illus., \$11.50. Price Correction.

YOU ARE YOUNGER THAN YOU THINK—Martin Gumpert—*Duell*, 244 p., \$2.75.

Science News Letter, August 12, 1944



MICROMAX

—A DEPENDABLE LAB WORKER

"I could use this Recorder on the data of various phenomena during my astronomical expeditions to Penang . . . Jamaica . . . Greenland," wrote one Professor after reading a description of the Micromax Recorder.

"Measuring and recording solution potentials of zinc and aluminum," is one use to which Aluminum Company research men put Micromax Recorders.

North Carolina State College uses Micromax to control A.S.T.M.-test furnaces; at Ohio State U. they record sunlight, dryer temperatures, pH, critical points of metals; are also useful in voltage, frequency, gas-analysis, etc.

A Micromax Recorder is a motor-driven, null-balance instrument—an outstanding value for both scientific and industrial work.

When inquiring about Micromax, be specific, so we may send a specific recommendation.

LEEDS & NORTHRUP COMPANY, 4077 STENTON AVE., PHILA. 44, PA.
LEEDS & NORTHRUP
 MANUFACTURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES
 Jrl. Ad. ND (4C)

•New Machines and Gadgets•

• SELF-HEATING soup can, a British invention now available to Americans in Normandy, resembles an ordinary can but has a metal disk in the center of the lid. Underneath is a fuse enclosed in a metal tube running down the middle of the can. Pry the disk off, light the fuse and the soup is hot in four minutes.

Science News Letter, August 12, 1944

• SEA MULE, or harbor jeep, a new powerful tug for handling vessels in harbors or on inland waters, is maneuverable, speedy and easy to operate. It is gasoline-engine powered and has two five-foot propellers which receive 286 horsepower each. It is 40 feet long, 15 feet wide, and has a draft of six feet.

Science News Letter, August 12, 1944

• SIMPLE home fruit or vegetable dehydrator, suitable for products that will not stick to the screen or become broken up by tumbling, is a revolving drum container rotating in a box in front of a row of electric heating lamps. The drum is made of wire screening or other perforated material.

Science News Letter, August 12, 1944

• PRECISION plate glass, a glass for optical use which may be substituted in some installations for true optical glass, is now made by newly-developed mass production methods. In reality it is a fine plate glass with precise parallelism of its surfaces.

Science News Letter, August 12, 1944



• NO-NAIL plywood boxes for shipping cases are held together with rods slipped into long circular holes in cleats fastened to the flat sides and in the wood or metal corner framing. No special milling tools are necessary in their manufacture.

Science News Letter, August 12, 1944

• SUPER-STRENGTH aluminum alloy, 90% aluminum and with magnesium and zinc as the principal other ingredients, is now used in war planes as skin or outside covering. Its compressive yield strength is twice that of ordinary structural steel, and its tensile strength 50% greater than the commonly-used aluminum.

Science News Letter, August 12, 1944

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 220.

BOOKS

SCIENCE NEWS LETTER will gladly obtain any American book or magazine in print for subscribers.

Send check or money order to cover regular retail price. If price is unknown, send \$5 and change will be returned. We will pay postage in the United States.

When publications are free, send 10¢ for handling.

Book Department

SCIENCE NEWS LETTER
1719 N Street, N.W.
Washington 6, D.C.

Question Box

AERONAUTICS

How many hours will it take the postwar luxury liner to cross the country? p. 106.
What advances have been made in gliders? p. 108.

BACTERIOLOGY

What is streptomycin? p. 105.

BIOLOGY

How have human eggs been artificially fertilized? p. 99.

BOTANY

How may fig leaves help the shoe leather business? p. 106.

ENGINEERING—MATHEMATICS

How does the new calculator solve intricate mathematical problems? p. 111.

INVENTION

What is the advantage of oatmeal ice-cream? p. 110.

MEDICINE

How does penicillin aid in skin grafting? p. 99.

How may DDT aid in studying the nervous system? p. 104.

Why is it best to eat when emotionally upset? p. 100.

Why is it thought that quinine is not necessary for the control of malaria? p. 101.

MILITARY SCIENCE

How are barbs used against the Axis? p. 102.

PLANT PATHOLOGY

What new menace is threatening our citrus trees? p. 110.

RADIO

How does the Radio Intelligence Division police the airwaves? p. 103.

The imprint to the right is mailing address for your Science News Letter.

Date on lower line is expiration of your subscription.

Renew early to avoid lapse in service.

In requesting change of address please give your old address as well as the new one, at least two weeks before change is to become effective.